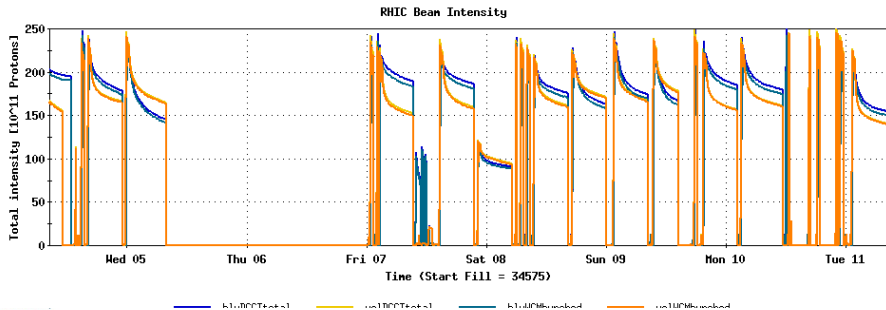
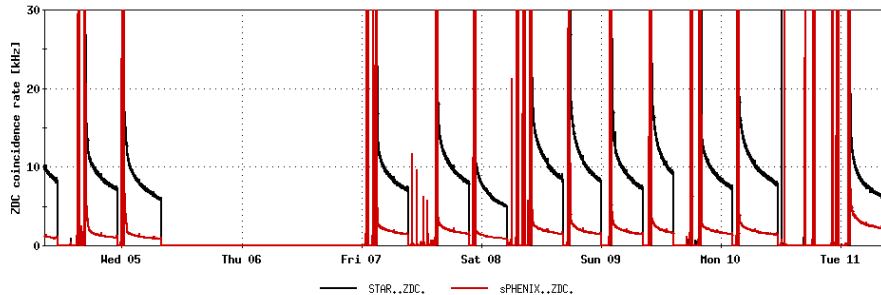


# RHIC Status

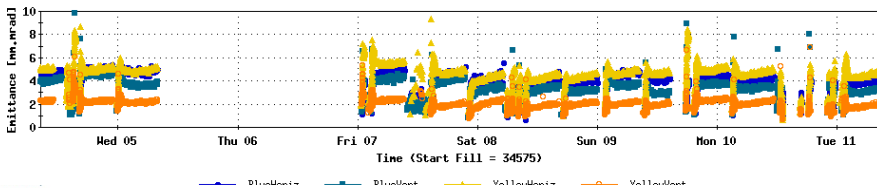
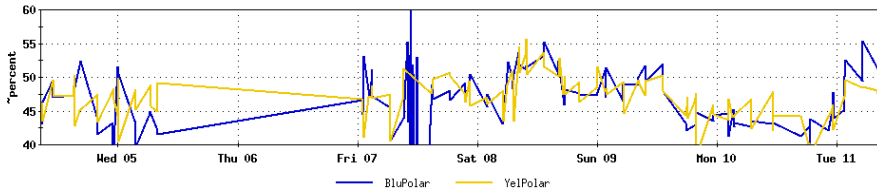
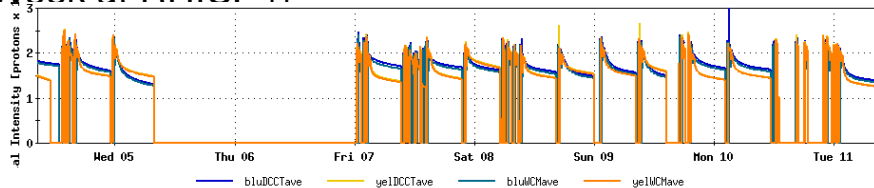
Kiel Hock

June 11", 2024

# Last Week at RHIC



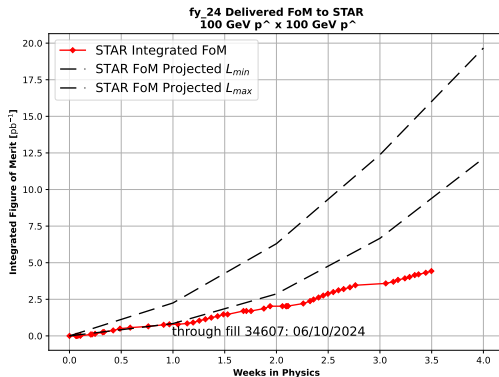
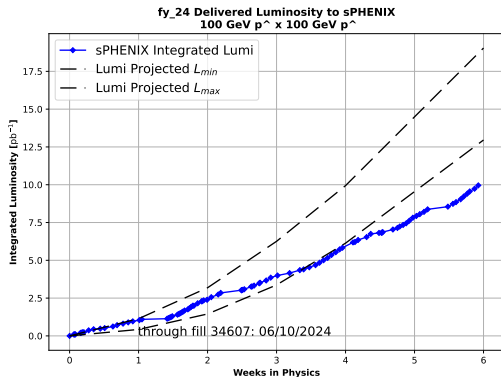
# Last Week at RHIC. II



# RHIC status and Lumi Projections

/ 111x111 physics running since 4/30.

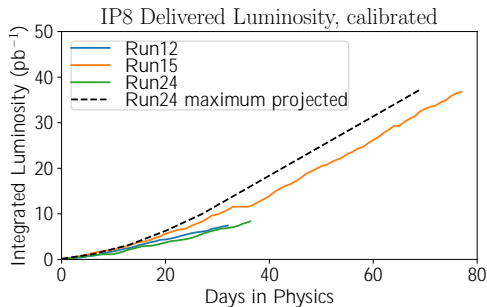
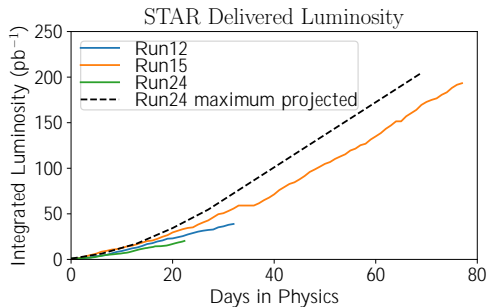
Preliminary luminosity accounting



# RHIC Status

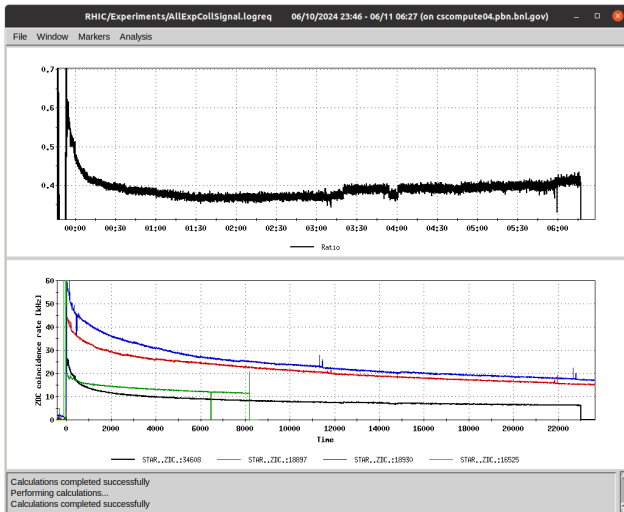
- / physics running with  $2.0 \times 10^{11}$ /bunch at store
- / we are now at the end of the "ramp up" period so luminosity projections are constant
- / integrated luminosity still a factor of 2 off from best Run15 stores
- / polarization up into the 40-55%, equal in both rings following MD last week
  - / blue  $s$  moved down 0.015 to get in range of 0.5 to 0.5025
- / RHIC has been ODH1 for the last week, requiring additional work planning and PPE for entrance
- / AGS MMPS exciter PS had failed resulting in almost 24 hours of downtime (two circuit boards replaced).
- / Both 56 MHz FPCs have been fully inserted
- / power dip Sunday due to bad termination on 138 kV line.
- / cold snake has increase heat load
  - / warmup tomorrow to try and clear possibly contaminants from cold head 5
- / APEX Tomorrow, 6/12

# Comparison with previous runs



- / Run15 and Run12 scaled based off of emittances and calculated crossing angle
- / A factor of 2 improvement would put STAR at the projected Luminosity/day
- / sPHENIX needs 60% increase

# Comparison with previous runs, II

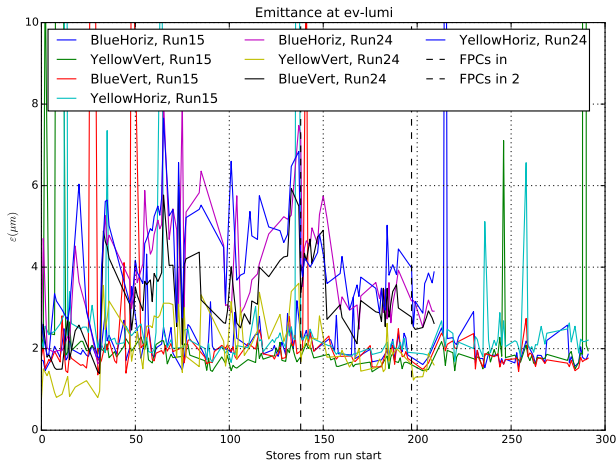


- ! 18930 is best store of Run15
- ! 18897 is arbitrary good store from Run15
- ! 16525 is best store of Run12
- ! 24608 is arbitrary good store from Run24

---

- ! Luminosity lifetime is worse now than Run12 and Run15
- ! Initial rates are above Run12
- ! ZDC rates at store are 40% of good Run15 rates

# Comparison with previous runs, III



! Emittances are currently 1.5-2x higher than run15 at ev-lumi

! Inserting the 56 MHz FPC greatly improved the intensity dependent emittance growth

! following IP4 scan and test ramps yesterday, there are two conclusions

! effects from 56 MHz are now largely suppressed

! emittance growth no longer intensity dependent



# Moving Forward

To improve luminosity:

- / \* squeeze MD
- / investigate collapse of IP8+IP6 bumps at different times
- / iterate on ramp chromaticity following ramp optics measurements
- / test Run22 ramp clone to 100 GeV
- / continue optimizing store lifetime
- / advance intensity

To improve polarization

- / measure spin tune of blue at injection to verify:
  - / nominal snake rotation at injection
  - / spin match from AGS to RHIC

Request 4 hours of MD for Thursday 1000-1400.

# Physics Checkpoints

- squeeze at IP8
- 1.0e11 protons per bunch @physics
- complete low-luminosity run for STAR
- sPHENIX running with nominal store conditions
- 1.7e11 protons per bunch @physics (Run12 maximum)
- 2.0e11 protons per bunch @physics
- 2.4e11 protons per bunch @physics (Run15 maximum)
- 2.4e11 protons per bunch and 60% polarization @physics (Run15 maximum)
- switch to alternate AGS setup
- 2.5e11 protons per bunch @physics
- 3.0e11 protons per bunch @physics